

NASA Astrobiology Institute General Meeting
Arizona State University, Tempe, AZ
February 9-12, 2003

Sunday, February 9, 2003

**8:00 AM – 4:00 PM Superstition Mountain Field Trip
(Pre-Registered)**

Pre-paid field trip to the Superstition Mountains. Please see attached shuttle information for hotel times of departure. Return time is 4:00 PM

Departure Point:
Embassy Suites
4400 S. Rural Road
Tempe, AZ 85282
480 897 7444

**1:00-5:30 Astrobiology Primer Sessions
Physical Sciences Building F Wing**

1:00 – 2:30 PM Primer Session - Biology **Ken Nealson**

2:30 – 4:00 PM Primer Session - Geology **Bruce Jakosky**

4:00 – 5:30 PM Primer Session - Astronomy **Alan Boss**

3:00-7:00 PM

Registration Open in the ASU Memorial Union Building, 2nd Floor – Register now to avoid the lines on Monday!

Shuttles available from hotel to ASU campus. See attached shuttle schedule

6:30 – 8:30 PM Welcome Reception – ASU Nelson Fine Arts Center

Come and explore the beautiful museum, eat great food and listen to wonderful live music while meeting your fellow NAI members and guests. Just follow the luminaria or ASU student guides from the registration desk at the ASU Memorial Union starting at 6:00 PM. Shuttle service will be available. See attached shuttle schedule.

Monday, February 10, 2003

7:00 AM Breakfast
Food Tent-Student Service Lawn
Conference badge required

7:00 AM-6:00 PM CYBER CAFÉ OPEN
Town Hall Meeting forum link available for attendee comments.

7:00 AM NAI Education and Public Outreach (EPO) Meeting
MU – La Paz Room
NAI Education and Public Outreach Lead meeting – Attendees will need to pick up breakfast in the food tent prior to attending.

8:30- 9:00 AM
Opening Session – Remarks and Welcome!
MU – Ventana Room

Dr. Jack Farmer, Host Arizona State University NAI Lead Team Principal Investigator
Dr. Michael Crow, Arizona State University President
Dr. Rosalind Grymes, NAI Acting Director

9:00 –10:00 AM
Plenary Session: The Search for Habitable Environments in the Cosmos
MU – Ventana Room

9:00 –9:30 AM	Life Beyond the Solar System: If, Where, When, and How? 13091	Alan Dressler <i>The Carnegie Institution of Washington, Carnegie Observatories</i>
9:30-10:00 AM	Prospects for Life in our Solar System and Intelligent Life Elsewhere 13071	Christopher Chyba <i>Center for the Study of Life in the Universe, SETI Institute and Department of Geological and Environmental Sciences, Stanford University</i>

10:00-10:30 AM
Break
MU - Hallway

Monday, February 10, 2003

10:30 –12:00 PM (Concurrent)

Special Session I: Astrobiology Perspectives in Exploring the Solar System

Session Co-Chairs: Laurie Leshin, Jonathan Lunine

MU – Ventana Room

10:30 –10:45 AM	Sub-freezing Activity of Microorganisms and the Potential Habitability of Mars' Polar Regions 12627	Bruce Jakosky , Kenneth Nealson, Corien Bakermans, Ruth Ley, Michael Mellon
10:45- 11:00 AM	Carbon on Mars: Reservoirs, Processes, and Implications for Biosignatures 13047	Laurie Leshin , Yulia Goreva, Paul Niles, Yunbin Guan
11:00-11:15 AM	Delivery of Water to the Terrestrial Planets 13033	Jonathan Lunine , John Chambers, Alexandro Morbidelli, , Laurie Leshin
11:15-11:30 AM	Titan and Prebiotic Chemistry 13048	Gene McDonald
11:30-11:45 AM	Convective Transport Within Europa 12891	Robert Pappalardo , Amy Barr
11:45-12:00 PM	Deuterium and the Interstellar Contribution to the Inventory Of Solar System Organic Materials 13057	Scott Sandford

10:30-12:00 PM (Concurrent)

Special Session II: Evolutionary Genomics

Session Chairs: Blair Hedges, James Lake

MU – Pima Theater

10:30-10:45 AM	Prokaryotic Phylogeny: Lateral Gene Transfer and Long Branch Attraction 13052	Herve Phillippe
10:45-11:00 AM	Interactions between Horizontal Gene Transfer and the Environment 12982	James Lake , Ravi Jain, Jonathan Moore, Maria Rivera
11:00-11:15 AM	Defining Prebiotic Ancestral Peptides and Proteins 12796	Monica Riley , Sulip Goswami, Laila Nahum
11:15-11:30 AM	Evidence for an Ancient Operon of Redox Biochemistry 12821	Janet L. Siefert , James Kasting
11:30-11:45 AM	Bacterial Tubulin: Evidence and Evolutionary Implications	James T. Staley , Cheryl Jenkins

Monday, February 10, 2003

11:45-12:00 PM **12742**
Temporal Constraints on the Origin of **S. Blair Hedges**, Jaime Blair,
Complex Multicellular Life Maria Venturi, David Boone,
13032 Jason Shoe

12:00-1:15 PM
Lunch
Various break out sessions, please read below
Buffet/Self Serve – Conference badge required
Food Tent – Student Services Lawn

12:00-1:15 PM

Minority Institution Breakout Session – NAI Faculty Sabbatical Presentations

MU – Turquoise Room

Box lunches provided for first 50 attendees. Other attendees are invited to pick up lunch in the food tent and return to hear the talks.

All attendees are invited to join the session for presentations by the NAI Minority Institution Program Faculty Sabbatical participants on the collaboration and research from the 2002 sabbaticals followed by a question/answer session and EPO discussion:

- **Todd Gary**, Tennessee State University
- **M. F. Mahmood**, Howard University
- **Lekan Letinwo**, Florida A&M University

12:00-1:15 PM

Discussion – Proposed Astronomy Focus Group

MU – Pima Theater

Box lunch provided for session attendees in the meeting room

12:00-1:15 PM

Focus Group Meeting – Europa

MU – Ventana Room

Box lunch provided for session attendees in the meeting room

1:15 PM – 2:15 PM (Concurrent)

Contributed Talks I:

Origin(s) of Living Systems

Session Chair: George Cody

MU – Ventana Room

1:15-1:30 PM

Does Abiotic Synthesis of Organic
Compounds in Hydrothermal

Thomas McCollum

Monday, February 10, 2003

Environments Require a Vapor Phase?
12638

1:30-1:45 PM	Replicating Vesicles 12741	Jack Szostak , Martin Hanczyc, Shelly Fujikawa, Irene Chen
1:45-2:00PM	A Rapid Route to Functional Peptides on the Early Earth 12980	David Ross
2:00-2:15 PM	Protometabolism under Hydrothermal Conditions: Primitive Carbon and Nitrogen Fixation Strategies of a Young Terrestrial Planet 12806	George Cody , Nabil Boctor, Robert Hazen, Hatten Yoder, Jay Brandes

1:15-2:15 PM (Concurrent)

Contributed Talks II:

Exploring for Habitable Planets Beyond the Solar System

Session Chairs: Jean Schneider, Eric Gaucher

MU – Pima Theater

1:15-1:30 PM	Astro-Venture: Engaging Students in Grades 5-8 in the Search for Habitable Planets 12751	Christina O’Guinn , Deborah Bazar, Brian Day
1:30-1:45 PM	Astrobiology with a Telescope and a Stopwatch 12938	William Moore , Ferenc Varadi
1:45-2:00 PM	Photometric Signatures of Earth-like Extrasolar Planets 12810	Sara Seager
2:00-2:15 PM	Astrobiological Implications of Forming the Solar System in an Ultraviolet-Rich Environment 12557	Alan Boss

Monday, February 10, 2003

2:15-3:15 PM (Concurrent)

Contributed Talks I:

Exploring for Life in The Solar System

Session Chair: Michelle Minitti

MU – Ventana Room

2:15-2:30 PM	THEMIS Data and the Search for Sites of Astrobiological Interest on Mars 12856	Steven Ruff , Philip Christensen
2:30-2:45 PM	Analysis of Areas of High Spectral Variance Detected in TES Data 12912	Sara Martinez-Alonso , Bruce Kindel, Michael Mellon
2:45-3:00 PM	Microbial Adaptation Strategies for Life in the Venusian Atmosphere 12747	Dirk Schulze-Makuch , Ousama Abbas, Louis Irwin, David Grinspoon
3:00-3:15 PM	Aerosols in Titan's Atmosphere: Implication for Astrobiology 12893	Hiroshi Imanaka , Bishun Khare, Emma L.O. Bakes, Christopher McKay, Jaime Elsila, D. Ryan McGlothlin, Richard Zare, Seiji Sugita, Takafumi Matsui

2:15-3:15 PM (Concurrent)

Contributed Talks II:

Evolution of Life

Session Chair: Dave Des Marais,

MU – Pima Theater

2:15-2:30 PM	The Role of Chlorophyll <i>d</i> in <i>Acaryochloris marina</i> 12684	Min Chen , Roger Hiller, Jeffrey Reimers, Anthony Larkum
2:30-2:45 PM	Evolution of Replicator Populations Under High Mutational Pressure: Stationary States and Muller's Ratchet in RNA Virus 12719	Susanna Manrubia , Ester Lazaro, Juan Perez-Mercader, Esteban Domingo, Cristina Escarmis
2:45-3:00 PM	The Large Scale Topology of the Tree of Life 12750	Norman Pace
3:00-3:15 PM	Stable Isotope Results from The Permian/Triassic Boundary, South Africa, and Triassic/Jurassic Boundary, Western Canada: Evidence Against	Peter Ward , Thomas Evans, Geoff Garrison, Roger Buick

Monday, February 10, 2003

Single Strike Impact as Causes for
These Two Mass Extinctions
12745

3:15-3:30 PM
Break
MU - Hallway

3:30-5:30 PM (Concurrent)
Contributed Talks III:
Recognizing and Interpreting Biosignatures
Session Chairs: Michael Arthur, Malcolm Walter
MU – Ventana Room

3:30-3:45 PM	The Classification of Biosignatures 12873	David McKay , Kathy Thomas-Keprta, Simon Clemett, Everett Gibson
3:45-4:00 PM	Ozone and UV Fluxes on Earth-like Planets Around Other Stars 12780	James Kasting , Kara Krelove, Martin Cohen, Victoria Meadows, David Crisp
4:00-4:15 PM	Deciphering Fe Isotope Biosignatures from the Rock Record through Experimental Determination of Isotopic Fractionation Factors 12689	Clark Johnson , Brian Beard, Susan Welch, Eric Roden, Kenneth Nealson
4:15-4:30 PM	Mass-dependent Oxygen Isotope Fractionation Laws: Markers for Biological Processes? 12679	Edward Young
4:30-4:45 PM	In Vivo "Breathalyzer" Testing of Sedimentary Microbial Communities 12964	Pamela Conrad , Gene McDonald
4:45-5:00 PM	Stromatolite Complexity as a Biosignature 12952	Frank Corsetti , Michael Storrie-Lombardi, Virginia Souza-Egipsy
5:00-5:15 PM	Tracing the Co-evolution of Nitrogen Metabolisms with the Chemical Evolution of the Atmosphere 12900	Dominic Papineau , Stephen Mojzsis, Bernard Marty
5:15-5:30 PM	Morphologies and Structures of Microfossils in HF-Etched Samples of Gunflint Chert 12895	Thomas Sharp , Alysia Cox, Bradley DeGregorio

Monday, February 10, 2003

3:30-5:30PM (Concurrent)

Contributed Talks IV:

Evolution of Life

Session Co-Chairs: Yanan Shen, Dave Des Marais,

MU – Pima Theater

3:30-3:45 PM	Micro*scope: A Web-based Tool for Research and Education in Microbial Diversity and Astrobiology 12752	Lorraine Olendzenski , David Patterson, Mitchell Sogin
3:45-4:00 PM	Identification of Symbiotic Partners in Hypersaline Microbial Mats 12772	Ruth Ley , John Spear, Katie Stain, Norman Pace
4:00-4:15 PM	The Evolutionary Relationship Between Nitrogen Fixation and Bacteriochlorophyll Synthesis 12872	Christopher Staples , Biswarup Mukhopadhyay, Robert Blankenship
4:15-4:30 PM	Chert Dikes: Perhaps the Best Sites for the Preservation and Discovery of Archean Microfossils and Biological Remains 12823	Donald Lowe
4:30-4:45 PM	Carbon and Oxygen Budgets of Hypersaline Cyanobacterial Mats: Effects of Tidal Cycle and Temperature 12841	David Des Marais , Brad Bebout, Steven Carpenter, Mykell Discipulo, Kendra Turk
4:45-5:00 PM	Sulfur Isotopic Constraints on the Archean Atmosphere and Oceans 12854	Shuhei Ono , Douglas Rumble, Jennifer Eigenbrode, Pushker Kharecha, Katherine Freeman, James Kasting, Alexander Pavlov
5:00-5:15 PM	Plankton and Isotope Changes at the Late Neoproterozoic Acraman Impact Ejecta Layer 12896	Kathleen Grey , Andrew Hill, Clive Calver, Malcolm Walter
5:15-5:30 PM	Evolution and Diversity of Dissimilatory Sulfite Reductase (<i>dsr</i>) in the Guaymas Basin 12735	Ashita Dhillon , Andreas Teske, Jesse Dillon, David Stahl, Mitchell Sogin

5:30-7:30 PM

NAI Student and Postdoc Gathering

Light snacks provided

Food Tent – Student Services Lawn

Tuesday, February 11, 2003

7:00 AM

Breakfast

Conference badge required to enter food tent

Food Tent – Student Service Lawn

7:00 AM-6:00 PM CYBER CAFÉ OPEN

Town Hall Meeting forum link available for attendee comments.

7:00-8:00 AM

Focus Group – Astrobiotechnology

MU – Turquoise Room

Attendees will need to pick up breakfast at the food tent prior to attending

7:00 AM

NAI EPO Meeting

MU – La Paz Room

NAI Education and Public Outreach Lead meeting – Attendees will need to pick up breakfast at the food tent prior to attending

8:30-10:00 AM

Plenary Session: Pathways to Life

MU – Ventana Room

8:30-9:15 AM

Self-assembly and Energy Flow
Through Molecular Systems
13062

Dave Deamer

*Department of Chemistry and
Biochemistry
University of California, Santa
Cruz*

9:15-10:00 AM

What is a Biosignature? What makes a
Planet Habitable? Matching Darwinian
Chemistry to Solar System Habitats
13058

Steve Benner

*Foundation for Applied
Molecular Evolution*

10:00-10:30 AM

Break

Light Refreshments

MU – Hallway

10:30-12:00 PM (Concurrent)

Special Session III: Searching for Life Outside the Solar System

Session Co-Chairs: Victoria Meadows, David Crisp

MU-Ventana Room

Tuesday, February 11, 2003

10:30-10:45 AM	How Unusual are Stars with Planets? 13060	I. Neill Reid
10:45-11:00 AM	The Formation of Earth-like Planets in Extrasolar Systems 13094	John Chambers
11:00-11:15 AM	What Compounds Do Micrometeorites Contribute to the Atmospheres of Habitable Planets? 13041	Monika Kress , George Cody, Donald Brownlee
11:15-11:30 AM	Environmental Consequences of an Emerging Biosphere 13068	Dave Des Marais
11:30-11:45 AM	Characterizing Extrasolar Terrestrial Planets Using Remote Sensing 13070	David Crisp , Victoria Meadows
11:45-12:00 PM	NASA's Terrestrial Planet Finder 13061	Steve Unwin , Charles Beichman

10:30-12:00 PM (Concurrent)

Special Session IV:

Life in Extreme Environments

Session Chair: John Baross

MU – Pima Theater

10:30-10:45 AM	Stochastic Astronomical Radiation and the Limits of Life 13093	J. C. Wheeler , J. M. Scalo, D. S. Smith, P. T. Williams
10:45-11:00 AM	Diversity of Rock-Hosted Microbial Communities from High pH Hydrothermal Vents at the Lost City Field 12881	Matthew Schrenk , P.J. Cimino, Deborah Kelley, John Baross
11:00-11:15 AM	Combining High-Pressure Physics with Biology 12704	Anurag Sharma , James Scott, George Cody, Marilyn Fogel, Robert Hazen, Russell Hemley, Wesley Huntress
11:15-11:30 AM	A New Photosynthetic Green Sulfur Bacterium Isolated from Deep-Sea Hydrothermal Vents 13040	Robert Blankenship , Michael Lince, Andrew Lang, F. Gerald Plumley, Jorg Overmann, Cindy Van Dover, J. Thomas Beatty
11:30-11:45 AM	Ultramafic-Hosted Hydrothermal Systems: The Lost City Field as a Possible Guide for Early Life	Deborah Kelley, Jeffrey Karson, Gretchen Fruh-Green, Matthew Schrenk

Tuesday, February 11, 2003

11:45-12:00 PM **12629**
Yellowstone National Park Offers
Public Access to Astrobiology
13012

Presented by **Kris Ludwig**
Catherine Tsairides, Diane
Chalfant, Dave Des Marais,
Jack Farmer, Nancy Hinman,
Rocco Mancinelli, Lynn
Rothschild, David Ward, Linda
Young

12:00-1:00 PM

Lunch

Conference badge required to enter food tent

Food Tent – Student Services Lawn

12:00-1:00 PM

Focus Group – Mars

MU Pima Theater

Box lunch provided for session attendees in meeting area

12:00-1:00 PM

Focus Group – Biological Consequences of Impact

MU Turquoise Room

Box lunch provided for session attendees in meeting area

12:00-1:00 PM

Discussion - Proposed Biosignatures Focus Group

MU – Yavapai Room

Box lunch provided for session attendees in meeting area

12:00-1:00 PM

IT Working Group

MU – Ventana Room

Box lunch provided for session attendees in meeting area

1:00-3:00 PM

International Partners

MU – Ventana Room

Presentations by Malcolm Walter – Australian Center for Astrobiology, Juan Perez-Mercader – Centro de Astrobiologia, Pascale Ehrenfreund – European Exobiology/Astrobiology Network, Ray Wolstencroft – United Kingdom Astrobiology Forum Network,

3:00-6:30 PM

POSTER SESSION

MU – Arizona Room

Tuesday, February 11, 2003

4:30-6:30 PM

NAI Astrobiology Drilling Program

MU – Pima Theater

Bruce Runnegar, Hiroshi Ohmoto

4:30-6:30 PM

Arizona Teacher's Special Session

Moeur Building – Physical Sciences, Building F

Pre-Invited Only – Limited Seating

4:30-5:30 PM

Special Student Discussion with Antonio Lazcano

MU – Turquoise Room

7:00-8:30 PM Public Lecture - ASU Gammage Auditorium

Speaker: Antonio Lazcano, Facultad de Ciencias, UNAM

Astrobiology and the Emergence of Life on Earth

7:00-7:30 PM

Selected Poster Exhibition

7:30 PM

Public Lecture begins

Wednesday, February 12, 2003

7:00 AM

Breakfast

Conference badge required to enter

Food Tent – Student Services Lawn

7:00 AM – 6:00 PM CYBER CAFÉ OPEN

Town Hall Meeting forum link available for attendee comments.

7:00 AM

NAI EPO Meeting

MU – La Paz Room

NAI Education and Public Outreach Lead meeting – Attendees will need to pick up breakfast at the food tent prior to attending

7:00-8:30 AM

Focus Group- Mission to Early Earth

MU- Pima Theater

Attendees will need to pick up breakfast at the food tent prior to attending

7:00-8:30 AM

Focus Group – Ecogenomics

MU – Turquoise Room

Attendees will need to pick up breakfast at the food tent prior to attending

8:30-10:00 AM

Plenary Session: The History of Life on Earth

MU – Ventana Room

8:30-9:15 AM

The Early Evolution of Life as
Reflected in the Molecular Record
13038

J. Peter Gogarten
*Department of Molecular and
Cell Biology, University of
Connecticut*

9:15-10:00 AM

Biomarkers: Molecular Signatures for
Early Life
13065

Roger Summons
*Department of Earth
Atmospheric and Planetary
Sciences, Massachusetts
Institute of Technology*

10:00-10:30 AM

Break

MU – Hallway

Light Refreshments

Wednesday, February 12, 2003

10:30-12:00 PM (Concurrent)

Special Session V:

Advances in Ecological Genomics

Session Chairs: Anna-Louise Reysenbach, Matthew Fields

MU – Ventana Room

10:30-10:45	Development of Specific and Sensitive Microarray-Based Technology for Detecting Microorganisms in Environmental Samples 13067	Jizhong Zhou, Xichun Zhou, Liyou Wu, Xuedan Liu, Dorothea Thompson <i>Presented by Matthew Fields</i>
10:45-11:00 AM	A Community Genomics Study of Microorganisms Associated with Acid Mine Drainage Generation 13059	Gene Tyson , Philip Hugenholtz, Jillian Banfield
11:00-11:15 AM	Expression Profiling of the Microbial Mat Organism: <i>Microcoleus chthonoplastes</i> 12660	Jillian Ward , Steven Biller, Mitchell Sogin, Hilary Morrison, John Waterbury
11:15-11:30 AM	Transcriptome Dynamics of <i>Deinococcus radiodurans</i> Recovering from Ionizing Radiation 13066	Yongqing Liu, Dorothea Thompson , Michael Daly, Jizhong Zhou
11:30-11:45 AM	Genome-based tree Building Applied to 55 Ecological Bacteria, Archaea, and Eukarya 13046	Christopher House , Sorel T. Fitz-Gibbon
11:45-12:00 PM	A Liquid Proteomics Analysis of Survival Mechanisms in Bacteria 12545	David Lubman , Suping Zheng, Albert Bennett, Richard Lenski

10:30-12:00 PM (Concurrent)

Special Session VI:

Early Biosphere Evolution

Session Chairs: Doug Erwin, Roger Summons

MU- Pima Theater

10:30-10:45 AM	Using the Great Oxidation Event and Whole Genome Sequences to Establish Upper Age Constraints for Multiple Archaeal Groups 12677	Carrine Blank , Jan Amend
10:45-11:00 AM	The Archean: Crucible of Creation or	John Lindsay , Martin Brasier,

Wednesday, February 12, 2003

	Cauldron of Crud, Data from Western Australia 12593	Nicola McLaughlin, Owen Green, Marilyn Fogel, Karen McNamara, Andrew Steele
11:00-11:15 AM	Diversity and Complexity of Early Eukaryotic Cell 12599	Emmanuel Javaux , Andy Knoll, Malcolm Walter
11:15-11:30 AM	Geochronological Constraints on Terminal Neoproterozoic Events and the Rise of Metazoans 13045	Samuel Bowring , Paul Myrow, Ed Landing, Jahan Ramenzani
11:30-11:45 AM	Estimating Metazoan Divergence Times with a Molecular Clock 13072	Kevin Peterson
11:45-12:00 PM	Partnership for Curriculum Innovation: Scientists and the Voyages Through Time Project 12999	Jane Fisher , Edna DeVore, Kathleen O'Sullivan

12:00-1:15 PM

Lunch

Food Tent – Student Services Lawn

12:00-1:15 PM

Focus Group – Evogenomics

MU -Pima Theater

12:00-1:15 PM

Focus Group – Astromaterials

MU – Turquoise Room

12:00-1:15 PM

Focus Group – Titan

MU – Yavapai Room

12:00-1:15 PM

Astrobiology Curriculum Discussion

MU – Ventana Room

12:00-1:15 PM

Minority Institution Meeting

Reserved Tables

Food Tent – Student Services Lawn

Wednesday, February 12, 2003

1:15-3:15 PM (Concurrent)

Contributed Talks V: Extremes of Life

Session Co-Chairs: Norman Pace, Edward Goolish

MU – Ventana Room

1:15-1:30 PM	Life in Rock: Novel Endolithic Microbial Communities in Yellowstone Geyser Basin 12607	Jeffrey Walker , Norman Pace
1:30-1:45 PM	High Throughput Approach to Study Ancient Microbial Phylogenetic Diversity in Permafrost as a Terrestrial Model of Mars 12659	Elena Spirina , Chai Benli, Davi Glichinsky, James Tiedje,
1:45-2:00 PM	Intrinsically and Pleomorphically Dwarf Bacteria and Archaea in a Semiarid Soil 12809	Thomas Kieft ,
2:00-2:15 PM	Global Rates of Sulfate Reduction in Deeply Buried Marine Sediments 12839	Scott Rutherford , Steven D'Hondt, Arthur Spivack
2:15-2:30 PM	Investigation of Steep Thermal and Chemical Gradients in Submarine Microbial Habitats 12920	Diane Nielsen , Deborah Kelley, John Delaney, Matthew Schrenk
2:30-2:45 PM	Ecosystem Diversity in Yellowstone National Park 12921	D'Arcy Meyer-Dombard , Everett Shock, Jan Amend
2:45-3:00 PM	Geochemical Habitats of Deeply-Branched Lineages 12922	Everett Shock , D'Arcy Meyer-Dombard, Jan Amend, Tobias Fisher, Anna-Louise Reysenbach
3:00-3:15 PM	The Tinto River, A Model System for an Iron World 12948	Ricardo Amils , Felipe Gomez, David Fernandez-Remolar, Elena Gonzalez-Toril, Nuria Rodriquez, Angeles Aguilera

1:15-3:15 PM (Concurrent)

Contributed Talks VI:

History of Planetary Habitability

Session Chairs: Alex Pavlov, Monica Kress

MU- Pima Theater

Wednesday, February 12, 2003

1:15-1:30 PM	The Oldest Known Sediments on Earth and What They Mean 12855	Stephen Mojzsis
1:30-1:45 PM	What are the Astrobiological Constraints from what is Known About the Late Heavy Bombardment? 12903	Clark Chapman
1:45-2:00 PM	Laboratory Investigations into the Production of Organic Haze Aerosols: Focus on the Early Earth 12848	Melissa Trainer , Daniel Curtis, Alexander Pavlov, Alice Delia, O. Brian Toon, Margaret Tolbert, Christopher McKay, Douglas Worsnop
2:00-2:15 PM	Volcanic Release of Methane and Hydrocarbons in Early Mars 12813	Antigona Segura , Rafael Navarro-Gonzalez
2:15-2:30 PM	Passing through Giant Molecular Cloud – Effects on Climate. Possible Link to Snowball Glaciations? 12822	Alexander Pavlov , O. Brian Toon, Anatoli Pavlov, John Bally
2:30-2:45 PM	Ocean Surfaces on Snowball Earth: Implications for Survival of Surface Life 12790	Stephen Warren
2:45-3:00 PM	Modeling the response of the Late Ordovician Climate System to Different Forcing Factors 12572	Achim Herrmann , Mark Patzkowsky
3:00-3:15 PM	Aeolian Processes and Long Period Climate Change on Mars 12644	John Armstrong , Conway Leovy, Tom Quinn, Robert Haberle, Jim Schaefer

3:15-3:30 PM
Break
MU - Hallway
Light Refreshments

3:30-5:00 PM
Plenary – Town Hall Meeting
Session Moderator: Seth Shostak
MU – Ventana Room

Announcement of and Presentation to the winner of the Gerald Soffen Award for The Best Student Poster Competition by Dr. Baruch S. Blumberg

Panel Discussion on the NAI Virtual Institute, Open Forum Feedback/Questions with: Rosalind Grymes, Michael Meyer, Jonathan Lunine, David Morrison,

Wednesday, February 12, 2003

5:00-5:30 PM

Break

MU - Hallway

Light Refreshments

5:30-6:30 PM

Concluding Lecture

Donald Johanson, Institute of Human Origins, Arizona State University

Our Evolutionary Journey: From Darkest Africa into Darkest Space

13092

MU – Ventana Room

**NAI GENERAL MEETING 2003
Logistics Sheet**

<p>Hilton Phoenix East/Mesa 1011 West Holmes Ave. Mesa, AZ 85210 480-833-5555</p>	<p>Tempe Downtown Courtyard 601 S. Ash Ave. Tempe, AZ 85281 480-966-2800</p>
<p>Sheraton Phoenix Airport Hotel 1600 S. 52nd St. Tempe, AZ 85281 480-967-6600</p>	<p>Embassy Suites 4400 S. Rural Road Tempe, AZ 85282 480-897-7444</p>

Emergency contact info:

- ASU DPS (Security) 480-965-3456
- Tempe Police 480-966-6211
- St. Luke’s Hospital, 1500 S. Mill Ave. 480-968-9411
- Walgreen’s 24hr pharmacy, 83 E. Broadway Rd. 480-921-9002

Getting Around Tempe

- Super Shuttle 1-800-BLUEVAN (1-800-258-3826)
- American Taxi 480-833-8333
- Ages Taxi 480-982-6500

ASU venues of interest 480-965-xxxx

- Anthropology Museum, Anthro. Bldg, x6224
- Art Museum, Nelson Fine Arts Center & Matthews Center, x2787
- Bookstore, east of MU, x7928
- Campus Arboretum, self-guided, x8467
- Center for Meteorite Studies, Physical Sciences C-wing, x3576
- Harry Wood Art Gallery, Art bldg, x6163
- Karsten Golf Course, x4653
- Mars Global Surveyor Space Flight Facility, Moeur Bldg, x1790
- Museum of Geology, Physical Sciences F-wing, x7065
- Northlight Photography Gallery, Matthews Hall, x6517
- ASU Sports Hall of Fame, Wells Fargo Arena, x6592
- University Libraries- Hayden, Noble Science & Engineering, Architecture, Music, Ross/Blakley Law
- ASU Visitor Information Center, corner of Rural Rd & Apache Blvd (826 E. Apache), x0100

Local Restaurants & Bars

Bandersnatch Brew Pub - 125 E. Fifth St. 480-968-4438
Laid back bar and grill

Beeloe's – 510 S. Mill Ave. 480-894-1230
Moderately priced Jazz Club with tasty cuisine

Café Boa – 709 S. Mill Ave. 480-968-9112
Small and cozy with unique and tasty Italian inspired dishes

Chilli's – 801 S. Mill Ave. 480-731-9482
No doubt they've got one of these near you at home!

Crocodile Café - 525 S. Mill Ave. 480-966-5883
Great people watching with California style cuisine

Dos Gringos Trailer Park - 216 E. University Dr. 480-968-7879
A packed place with simple Mexican food and \$2 Corona

Gordon Biersch – 420 S. Mill Ave. 480-736-0033
Laid back atmosphere, good for groups, “divine” beer and the food “holds its own”

Jax Thai Bar - 420 S. Mill Ave. 480-921-8800
Thai food and a variety of cocktails

Macayo's Depot Cantina - 300 S. Ash Ave. 480-966-6677
Quality Mexican food and great margaritas

Mama's Pizzeria- 106 E. University Dr. 480-894-6262
Killer calzones, beer by the pitcher, active, fun, good place for groups

PF Chang's China Bistro - 740 S. Mill Ave. 480-731-4600
Classy, casual chain with Asian infused dishes.

Rustler's Rooste – 777 S. Pointe Pkwy, Phoenix 602-431-6474
Western steak house, with live music and a slide inside, fun for groups

Rula Bula Irish Pub – 401 S. Mill Ave. 480-929-9500
Irish food and Guinness on tap.

Other Activities

- AMF Bowling/ Tempe Village Lanes – 4407 S. Rural Road 480-831-5322
- Brunswick Mesa Lanes – 1754 W. Southern Ave, Mesa 480-834-0588

- Kolby's Corner Pocket Billiards – 1301 E. University Dr. 480-829-7344
- Landshark's Billiards & Sports Lounge – 1112 E. Apache Blvd, 480-804-1112

Shuttle Schedule

Sunday, 1/9

Field Trip

The meeting spot for the field trip is the Embassy Suites. If you are driving, there will be free parking available, if you need transportation, a shuttle from each hotel, to the Embassy Suites will be provided.

THERE WILL ONLY BE ONE BUS FROM EACH HOTEL!!!

Depart	Pick-Up	Destination
7:15 am	Courtyard Downtown	Embassy Suites
7:15 am	Hilton	Embassy Suites
7:15 am	Sheraton	Embassy Suites

At the end of the field trip, all buses will return passengers to their respective hotels.

Depart	Pick-Up	Destination
12:00 pm	Embassy Suites	ASU Campus/ MU until 5:00 pm Welcome Reception after 5:00 pm
12:00 pm	Hilton	ASU Campus/ MU until 5:00 pm
12:00 pm	Sheraton	Welcome Reception after 5:00 pm

Shuttles will depart the hotels every 30 minutes after that, until 8:00 pm.

Depart	Pick-Up	Destination
12:30 pm	ASU Campus/ MU until 5:00 pm Welcome Reception after 5:00 pm	Embassy Suites
12:30 pm	ASU Campus/ MU until 5:00 pm Welcome Reception after 5:00 pm	Hilton
12:30 pm	ASU Campus/ MU until 5:00 pm Welcome Reception after 5:00 pm	Sheraton

Shuttles will depart the MU or Welcome every 30 minutes after that until 8:30 pm.

Monday, 1/10/03

Depart	Pick-Up	Destination
6:00 am	Embassy Suites	ASU Campus/ MU
6:00 am	Hilton	ASU Campus/ MU
6:00 am	Sheraton	ASU Campus/ MU

Shuttles will depart the hotels every 30 minutes after that, until 8:00 pm.

Depart	Pick-Up	Destination
6:30 am	ASU Campus/ MU	Embassy Suites
6:30 am	ASU Campus/ MU	Hilton
6:30 am	ASU Campus/ MU	Sheraton

Shuttles will depart the MU every 30 minutes after that, until 8:30 pm.

Tuesday, 1/11/03

Depart	Pick-Up	Destination
6:00 am	Embassy Suites	ASU Campus/ MU
6:00 am	Hilton	ASU Campus/ MU
6:00 am	Sheraton	ASU Campus/ MU

Shuttles will depart the hotels every 30 minutes after that, until 8:00 pm.

Depart	Pick-Up	Destination
6:30 am	ASU Campus/ MU	Embassy Suites
6:30 am	ASU Campus/ MU	Hilton
6:30 am	ASU Campus/ MU	Sheraton

Shuttles will depart the MU every 30 minutes after that, until 8:30 pm.

Wednesday, 1/12/03

Depart	Pick-Up	Destination
6:00 am	Embassy Suites	ASU Campus/ MU
6:00 am	Hilton	ASU Campus/ MU
6:00 am	Sheraton	ASU Campus/ MU

Shuttles will depart the hotels every 30 minutes after that, until 7:00 pm.

Depart	Pick-Up	Destination
6:30 am	ASU Campus/ MU	Embassy Suites
6:30 am	ASU Campus/ MU	Hilton
6:30 am	ASU Campus/ MU	Sheraton

Shuttles will depart the MU every 30 minutes after that, until 7:30 pm.